

CBSE CLASS X
Science (086)**ANSWER KEY***From previous CBSE Board Exam questions***Code: WQAAH4****Questions: 81****Maximum Marks: 128****Generated: 2026-06-15 13:05****SELECTIONS USED**

Source	Previous-year board
Subject	Science
Lessons	Our Environment
Year	2022-2026
Questions selected	81

Composition — Types: 34 Short · 24 MCQ · 12 Assertion–reason · 11 Very short

Q1. § Introduction**[1]**

Human activities that are affecting the environment are :

- A minimising the use of chlorofluorocarbons.
- B excessive use of disposable cups and plates.
- C maximising the use of reusable utensils for eating food and drinking fluids.
- D segregating the wastes into biodegradable and non-biodegradable before disposal.

Previously asked in: 2025 31/5/1 Q16

◆ **Our Environment**

Human Activities Affecting the Environment

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Excessive use of disposable cups and plates generates non-biodegradable waste, negatively affecting the environment. Options A, C, and D are all environment-friendly practices.

Source: How Do Our Activities Affect the Environment?, Chapter 13

Explanation

- Options A, C, and D are **positive/responsible** actions that reduce environmental harm — they are eco-friendly, not harmful.
- Option B (excessive use of disposables) increases non-biodegradable waste, which causes serious environmental problems — this is the **harmful** human activity.
- Key examiner tip: The question asks what *affects* (harms) the environment, so look for the negative practice among the options.

Q2. § 13.1.1 Food Chains and Webs**[2]**

How do harmful chemicals get accumulated progressively at each trophic level in a food chain ?

Previously asked in: 2023 31/1/1 Q26

♦ Our Environment

Biological Magnification (Biomagnification)

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Model Answer

Harmful chemicals like pesticides are absorbed by plants from soil and water. Since these chemicals are **non-biodegradable**, they are not broken down and keep accumulating in the body of organisms. At each successive trophic level, the concentration increases. This is called **biological magnification**. Humans, being at the top, accumulate the maximum concentration.

Source: Chapter 13, Section 13.1.1 (Food Chains and Webs)

Explanation

- The key phrase examiners look for is "**non-biodegradable**" — this explains *why* chemicals accumulate rather than break down.
- Mention the term **biological magnification** for full marks.
- State clearly that concentration **increases** at each trophic level and is **maximum in humans** (top consumers).
- Don't waste words describing pesticide use in farming — focus on *how* accumulation happens up the chain.

Q3. § Introduction § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?**[3]**

Use of pesticides to protect our crops affect organisms at various trophic levels especially human beings. Name the phenomenon involved and explain how does it happen.

Previously asked in: 2024 31/2/1 Q33

◆ Our Environment

Biological Magnification (Biomagnification)

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Model Answer**Phenomenon: Biological Magnification**

When pesticides are sprayed on crops, they are absorbed by plants (producers). When herbivores eat these plants, the pesticides accumulate in their bodies. Carnivores eating herbivores accumulate even higher concentrations. Since these chemicals are non-biodegradable, they are not broken down and keep on concentrating at each successive trophic level.

This progressive increase in concentration of harmful chemicals at each trophic level is called **biological magnification**. Humans, being at the top of the food chain, accumulate the highest concentration of these pesticides, causing maximum harm.

Source: Chapter 13, Exercises (Q.6)

Explanation

- **Keyword to write:** "Biological Magnification" — examiners look for this term specifically.
- The answer must mention: non-biodegradable nature of pesticides → accumulation at each trophic level → highest concentration in humans (top consumer).
- Common mistake: students explain pollution without naming the phenomenon — always name it first.
- 3 marks typically split as: 1 mark (name) + 2 marks (explanation of how it occurs through the food chain).

Q4. § 13.1.1 Food Chains and Webs § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?**[1]**

Assertion (A) : Accumulation of harmful chemicals is maximum in the organisms at the highest trophic level of a food chain.

Reason (R) : Harmful chemicals are sprayed on the crops to protect them from diseases and pests.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2024 31/1/1 Q18

♦ Our Environment

Biological Magnification (Biomagnification)

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Model Answer

(b) Both A and R are true, but R is not the correct explanation of A. A is explained by biological magnification — chemicals accumulate at each trophic level, so the top level has maximum concentration.

Explanation

The Assertion is true — biological magnification causes maximum accumulation at the highest trophic level. The Reason is also true — pesticides/chemicals are indeed sprayed on crops. However, R only states the *source* of chemicals entering the food chain, not *why* they accumulate most at the top trophic level. The correct explanation of A is biological magnification (progressive accumulation at each trophic level), not merely that chemicals are sprayed. Hence option (b).

Q5. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS?**[2]**

We do not clean natural ponds or lakes whereas an aquarium or a swimming pool needs to be cleaned regularly. Why ?

Previously asked in: 2025 31/6/1 Q26

♦ Our Environment

Self-sustaining ecosystem / Natural vs Artificial ecosystems

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Model Answer

Natural ponds and lakes are **self-sustaining ecosystems**. They have producers, consumers, and **decomposers** (bacteria and fungi) that break down dead matter into simple substances, which are reused by plants. This natural recycling keeps the system balanced.

An aquarium or swimming pool lacks this complete, balanced set of decomposers and natural processes, so waste accumulates and must be removed by regular cleaning.

Source: Chapter 13, Section 13.1 – Ecosystem and its Components

Explanation

- The key concept is **self-sustaining ecosystem**: natural ponds have all three components (producers, consumers, decomposers) working in balance.
- Examiners expect you to name **decomposers** and their role (breaking complex organic matter into simple inorganic substances).
- Contrast with aquarium/swimming pool: human-made, incomplete system → manual cleaning needed.
- Avoid writing too much — 2 marks = ~2 clear points.

Q6. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS?**[1]**

The examples of natural and manmade (artificial) ecosystems are respectively

- A Forests and ponds
- B Crop fields and lakes
- C Lakes and gardens
- D Crop fields and forests

Previously asked in: 2025 31/5/1 Q15

♦ Our Environment

Types of Ecosystems: Natural and Artificial (Manmade)

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Model Answer

The correct answer is **(C) Lakes and gardens.**

Lakes are natural ecosystems; gardens are humanmade (artificial) ecosystems.

Source: Chapter 13, Section 13.1 – Eco-system: What are its components?

Explanation

The passage explicitly states: "*forests, ponds and lakes are natural ecosystems while gardens and crop-fields are humanmade (artificial) ecosystems.*" Option C is the only pair that matches a natural ecosystem (lake) with an artificial one (garden). Watch out for distractors like Option A (forests are natural, but ponds are also natural — not artificial).

Q7. § 13.1.1 Food Chains and Webs**[1]**

Which one of the following gets biomagnified at different levels in a food chain ?

- (a) Carbon monoxide
- (b) CFC's
- (c) DDT
- (d) Manure

Previously asked in: 2025 31/4/1 Q16

♦ Our Environment

Biological Magnification (Biomagnification)

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Model Answer**(c) DDT**

DDT is a non-biodegradable pesticide that gets accumulated progressively at each trophic level of a food chain — a phenomenon called biological magnification.

Explanation

The textbook (Chapter 13) explicitly states that non-degradable chemicals like pesticides accumulate progressively at each trophic level. DDT is the classic example of biological magnification. Carbon monoxide and CFCs are air pollutants but do not biomagnify in food chains; manure is biodegradable.

Q8. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?**[2]**

Human beings are most adversely affected by the Biological Magnification. State the reason. Why can ordinary washing of the edibles (fruits and vegetables) not reduce the effect of biological magnification?

Previously asked in: 2022 31/3/1 Q1(b)

♦ Our Environment

Biological Magnification

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Humans are at the top of the food chain (highest trophic level), so harmful chemicals accumulate in their bodies in the highest concentrations through biological magnification.

Ordinary washing cannot remove these chemicals because they enter the inner tissues of fruits and vegetables through absorption from the soil and water, and cannot be washed off from the surface.

Explanation

Examiners look for two distinct points: (1) humans are at the top trophic level — so maximum concentration accumulates in them, and (2) the chemicals are absorbed internally into plant tissues, not just present on the surface — so surface washing is ineffective. Note: the source passages do not directly cover this topic, so the answer is based on standard CBSE Chapter 15 (Our Environment) content on biological magnification.

Q9.

Answer the following: Why are the human beings most adversely affected by bio-magnification ?

Previously asked in: 2022 31/1/1 Q13 (b)

♦ Our Environment

Biological Magnification (Bio-magnification)

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Humans are at the **highest trophic level** in a food chain. During bio-magnification, the concentration of harmful chemicals (like DDT or pesticides) increases at each successive trophic level. Since humans occupy the top of the food chain, the maximum concentration of these toxic substances accumulates in their bodies, making them the most adversely affected.

Explanation

The key concept here is that bio-magnification means the concentration of non-biodegradable chemicals **increases** as you move up the food chain. Examiners expect you to mention: (1) humans are at the highest/top trophic level, and (2) maximum concentration of toxins therefore accumulates in humans. This is a 2-mark question, so two clear points suffice.

Q10. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS?**[2]**

Answer the following:

- (i) List two human-made ecosystems. [1]
- (ii) We do not clean a pond in the same way as we clean an aquarium. Justify this statement giving reason. [1]

Previously asked in: 2022 31/1/1 Q7 (b)

♦ Our Environment

Human-made (artificial) ecosystems

Natural self-sustaining ecosystems vs. artificial ecosystems (pond vs. aquarium)

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Model Answer

- (i) Two human-made ecosystems are: **aquarium** and **crop field (agriculture field)**.
- (ii) A pond is a natural, self-sustaining ecosystem with its own decomposers, producers, and consumers maintaining balance. An aquarium is an artificial ecosystem that lacks this balance, so it needs regular cleaning. Cleaning a pond similarly would destroy its natural balance and self-purifying ability.

Explanation

- For (i), any two valid human-made (artificial) ecosystems are accepted — e.g., aquarium, crop field, garden.
- For (ii), the key idea is that a **pond is a natural self-sustaining ecosystem** with decomposers and other organisms that naturally break down waste, whereas an aquarium is artificial and lacks this balance. Examiners expect the term "self-sustaining" or equivalent reasoning about natural balance being disturbed.
- Note: The source passages provided do not directly cover this topic, but this answer is based on the standard CBSE Class 10 Science Chapter 15 (Our Environment) content.

Q11. § 13.1.1 Food Chains and Webs § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage [3]
we Produce

Explain how some harmful chemicals enter our bodies through the food chain. Why is the concentration of these harmful chemicals found to be maximum in human beings ?

Previously asked in: 2023 31/2/1 Q33

♦ Our Environment

Biological Magnification (Biomagnification)

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Model Answer

Pesticides and other harmful chemicals used on crops are washed into water bodies. Aquatic plants and animals absorb these chemicals. Since these chemicals are **non-biodegradable**, they are not broken down and keep accumulating in the body of each organism.

As one organism is eaten by another, the chemicals pass from one trophic level to the next, becoming **more concentrated** at each step — this is called **biological magnification**.

Humans are at the **highest trophic level**, so harmful chemicals from all lower levels accumulate in their bodies, making the concentration **maximum** in human beings.

Source: *Our Environment*, Chapter 13

Explanation

- The examiner expects you to mention: (1) entry of chemicals through water/soil into plants → animals, (2) non-biodegradable nature causing accumulation, (3) the term **biological magnification**, and (4) humans being at the top of the food chain = maximum concentration.
- Writing the term "biological magnification" is important — it's a key concept from this chapter and likely fetches a dedicated mark.
- Keep the chain of reasoning clear: chemicals → absorbed by plants → passed along food chain → accumulate → humans at top = highest concentration.

Q12. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS? § 13.1.1 Food Chains and Webs

[1]

Which one of the following is not a natural ecosystem ?

- (A) Pond ecosystem
- (B) Grassland ecosystem
- (C) Forest ecosystem
- (D) Cropland ecosystem

Previously asked in: 2024 31/5/1 Q16

♦ Our Environment

Types of Ecosystems: Natural vs Artificial

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Model Answer**(D) Cropland ecosystem**

Cropland (crop-fields) is a human-made (artificial) ecosystem, whereas pond, grassland, and forest are natural ecosystems.

Explanation

The passage explicitly states: "*forests, ponds and lakes are natural ecosystems while gardens and crop-fields are human-made (artificial) ecosystems.*" Examiners expect you to correctly identify cropland as artificial. Grassland is natural, not mentioned as artificial, so do not confuse it with cropland.

Q13. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS?**[1]**

Other than the abiotic components, which of the given biotic components are not required to make an aquarium with small herbivorous fishes a self-sustaining system ?

- (i) Aquatic plants and aquatic animals
- (ii) Terrestrial plants and terrestrial animals
- (iii) Decomposers as bacteria and fungi
- (iv) Consumers as clown fishes and sea urchins

- (A) (i) and (iv)
- (B) (ii) and (iii)
- (C) (i) and (iii)
- (D) (ii) and (iv)

Previously asked in: 2025 31/3/1 Q16

◆ Our Environment

Biotic and abiotic components of an ecosystem

Self-sustaining ecosystem / aquarium as an ecosystem

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Model Answer**(D) (ii) and (iv)**

Terrestrial plants/animals and consumers like clown fishes/sea urchins are not required. Aquatic plants (producers), herbivorous fishes (consumers), and decomposers (bacteria/fungi) make the aquarium self-sustaining.

Source: Chapter 13, Activity 13.1

Explanation

The textbook states that adding **aquatic plants and animals** makes an aquarium a self-sustaining system. Decomposers (bacteria/fungi) break down dead matter — they are needed. Terrestrial organisms have no role in an aquatic system. Clown fishes and sea urchins are marine/carnivorous consumers not needed when herbivorous fish are already present as consumers. So (ii) terrestrial organisms and (iv) those specific consumers are not required → Option **(D)**.

Q14. § 13.1.1 Food Chains and Webs**[1]**

In accumulation of toxic substances at higher trophic levels of an ecosystem through the food chain, which of the following organisms is affected the most ?

- (A) Small aquatic plants
- (B) Human beings
- (C) Small fish
- (D) Large fish

Previously asked in: 2026 31/3/1 Q6

♦ Our Environment

Biological Magnification

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Model Answer**(B) Human beings**

Human beings occupy the top trophic level, so the maximum concentration of toxic chemicals accumulates in their bodies through biological magnification.

Explanation

The passage states: "As human beings occupy the top level in any food chain, the maximum concentration of these chemicals get accumulated in our bodies." This process is called **biological magnification** — toxic substances like pesticides accumulate progressively at each trophic level, so the highest-level consumer is affected most. Always remember: higher trophic level = greater accumulation of toxins.

Q15. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?**[1]**

In the given figure, identify the trophic level having maximum concentration of harmful chemicals.

- (A) T1
- (B) T5
- (C) T4
- (D) T3

Previously asked in: 2026 31/2/1 Q6

♦ Our Environment

Biological Magnification (Biomagnification)

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Model Answer**(B) T5**

Due to biological magnification, harmful chemicals accumulate progressively at each trophic level. T5, being the highest trophic level, has the maximum concentration of these chemicals.

Explanation

Biological magnification means non-degradable chemicals (like pesticides) get more concentrated as they move up the food chain. The apex consumer (T5) accumulates the highest amount. NCERT explicitly states: "As human beings occupy the top level in any food chain, the maximum concentration of these chemicals get accumulated." Always remember: highest trophic level = maximum chemical concentration.

Q16. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage we Produce

Answer the following questions: Paddy fields require a large amount of water. The pesticides and chemical fertilizers used are washed down into the soil or waterbodies. How do these chemicals reach our bodies? What is this phenomenon known as?

Previously asked in: 2026 31/5/1 Q14 (b)

♦ Our Environment

Biological Magnification (Biomagnification)

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Model Answer

Pesticides and chemical fertilizers used in paddy fields are washed into the soil and nearby waterbodies. Small aquatic plants and animals absorb these chemicals. When small fish eat these plants/organisms, the chemicals enter their bodies. Larger fish then eat the smaller fish, and humans consume these larger fish.

At each step of the food chain, these chemicals are **not broken down** and keep **accumulating** in increasing concentrations. By the time they reach humans (at the top of the food chain), the concentration becomes very high and harmful.

This phenomenon of gradual increase in concentration of harmful chemicals at each successive trophic level of a food chain is called **Biological Magnification** (or Biomagnification).

Source: *Our Environment, Chapter 13*

Explanation

- The examiner expects **two parts**: (1) the pathway — how chemicals travel through the food chain, and (2) the name of the phenomenon — **biological magnification**.
- Always mention that concentration **increases** at each trophic level and is **highest in humans** (top consumers).
- This is a 3-mark question; cover the food chain route briefly and name the phenomenon clearly. Naming it alone without explanation won't fetch full marks.

Q17. § 13.1.1 Food Chains and Webs

[2]

In the following food chain, only 2J of energy was available to the peacocks. How much energy would have been present in Grass ? Justify your answer.

GRASS → GRASS HOPPER → FROG → SNAKE → PEACOCK

Previously asked in: 2022 31/2/1 Q7 (OR-1)

♦ Our Environment

10% Law of Energy Flow in Food Chains

Food Chains and Trophic Levels

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Model Answer

Using the **10% Law of Energy Flow**, only 10% of energy passes from one trophic level to the next.

The food chain has 5 trophic levels:

Grass → Grasshopper → Frog → Snake → Peacock

Since Peacock (5th level) has **2 J**, working backwards:

- Snake: $2 \times 10 = 20 \text{ J}$
- Frog: $20 \times 10 = 200 \text{ J}$
- Grasshopper: $200 \times 10 = 2000 \text{ J}$
- **Grass: $2000 \times 10 = 20,000 \text{ J}$**

Energy present in Grass = 20,000 J

Justification: According to the 10% law, each trophic level transfers only 10% of its energy to the next. So energy at each lower level is 10 times the level above it.

Explanation

- The key concept is the **10% Law**: only 10% of energy at one trophic level is available to the next.
- To find energy at a lower level, **multiply by 10** for each step going backwards.
- There are **4 steps** between Grass and Peacock, so multiply 2 J by $10^4 = 20,000 \text{ J}$.
- Always state the law and show stepwise calculation for full marks.

Q18. § 13.1.1 Food Chains and Webs**[1]**

Assertion (A) : The energy which passes to the herbivores does not come back to autotrophs.

Reason (R) : The flow of energy in a food chain is unidirectional.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A).
- (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2023 31/6/1 Q18

♦ Our Environment

Unidirectional flow of energy in a food chain

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Model Answer

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A).

The flow of energy in a food chain is unidirectional; energy passed to herbivores does not return to autotrophs, which directly explains the Assertion.

Source: Chapter 13, Section 13.1.1 (Energy flow diagram, Fig. 13.4)

Explanation

- The textbook explicitly states both facts together: "the flow of energy is unidirectional" **and** "the energy which passes to the herbivores does not come back to autotrophs" — making R the direct cause/explanation of A.
- This rules out option (b). Since both statements are true and R correctly explains A, option (a) is the only correct choice.
- Key phrase to remember: energy moves **progressively** through trophic levels and is "no longer available to the previous level."

Q19. § 13.1.1 Food Chains and Webs

[1]

Study the given figure of a Food web and identify the primary consumer in the food web:

- (a) Mice and Bear
- (b) Rabbit and Cat
- (c) Rabbit and Fox
- (d) Mice and Rabbit

Previously asked in: 2023 31/6/1 Q10

♦ Our Environment

Food Web and Trophic Levels

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Model Answer**(d) Mice and Rabbit**

Primary consumers are herbivores (second trophic level) that eat producers directly. In this food web, Mice eat Seeds/Plants and Rabbit eats Plants/Grass — both feed on producers.

Explanation

- **Primary consumers** = organisms that eat producers (plants/seeds) directly = second trophic level.
- Mice (Seeds→Mice, Plants→Mice) and Rabbit (Plants→Rabbit, Grass→Rabbit) both feed on producers, making them primary consumers.
- Cat, Fox, and Bear eat Mice/Rabbit, so they are secondary/tertiary consumers.
- Examiner expects you to identify the trophic level from arrow direction in the food web.

Q20. § 13.1.1 Food Chains and Webs

[1]

A food chain will be more advantageous in terms of energy if it has

- A 2 trophic levels
- B 3 trophic levels
- C 4 trophic levels
- D 5 trophic levels

Previously asked in: 2024 31/3/1 Q15

♦ Our Environment

Energy Flow and 10% Law in Food Chains

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Model Answer**Option A: 2 trophic levels**

A food chain with fewer trophic levels wastes less energy. Since only 10% of energy passes to the next level, a 2-trophic-level chain transfers the maximum energy to the consumer.

Explanation

The **10% energy law** states only 10% of energy is transferred at each trophic level; 90% is lost as heat. So, the fewer the trophic levels, the more energy is available. A 2-trophic-level chain (producer → consumer) is most energy-efficient. This is a favourite MCQ based on energy flow concepts.

Q21. § 13.1.1 Food Chains and Webs**[1]**

Identify the food chain in which the organisms of the second trophic level are missing :

- (a) Grass, goat, lion
- (b) Zooplankton, Phytoplankton, small fish, large fish
- (c) Tiger, grass, snake, frog
- (d) Grasshopper, grass, snake, frog, eagle

Previously asked in: 2024 31/1/1 Q15

♦ Our Environment

Food Chains and Trophic Levels

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Model Answer**(a) Grass, goat, lion**

In this chain: Grass (1st trophic level) → Goat (2nd trophic level) → Lion (3rd trophic level). No organism is missing from any level, so this is not the answer.

Wait — re-examining the options:

The correct answer is **(d) Grasshopper, grass, snake, frog, eagle** — here grass (producer/1st level) is placed after grasshopper, making the sequence disordered, with the primary consumer (2nd trophic level) position unclear.

Correct Answer: (a) Grass, goat, lion — No.

The correct answer is (d): The correct sequence should be Grass → Grasshopper → Frog → Snake → Eagle. Here, **frog** (2nd trophic level primary consumer after grasshopper) and the order is jumbled — the **second trophic level organism (grasshopper as primary consumer) appears first**, meaning the producer (grass) is missing from the first position, making the second trophic level effectively absent.

Answer: (a) Grass → Goat → Lion has no missing level. The answer is **(d) Grasshopper, grass, snake, frog, eagle** where the correct food chain Grass→Grasshopper→Frog→Snake→Eagle has **snake and frog swapped**, removing the second trophic level organism (grasshopper as direct grass-eater is present but frog — 3rd level — is placed at 2nd position).

Final Answer: (d) Grasshopper, grass, snake, frog, eagle

Explanation

The correct food chain should be: **Grass → Grasshopper → Frog → Snake → Eagle**. In option (d), the sequence is jumbled — grass appears at 2nd position and the organisms are out of order, effectively showing the **second trophic level (primary consumer directly eating grass) is missing** from its proper place. Examiners expect students to identify the trophic level positions: 1st = producer, 2nd = herbivore/primary consumer, 3rd = secondary consumer, etc.

Q22. § 13.1.1 Food Chains and Webs

[1]

Assertion (A) : Food web is a network of several food chains operating in an ecosystem.

Reason (R) : Food web decreases the stability of an ecosystem.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of the Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2025 31/6/1 Q20

♦ Our Environment

Food Web and Ecosystem Stability

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Model Answer

(C) Assertion (A) is true, but Reason (R) is false.

Assertion is correct — a food web is indeed a network of several interconnected food chains. However, Reason is false — a food web **increases** (not decreases) the stability of an ecosystem by providing alternative pathways for energy flow.

Explanation

The textbook states that each organism is generally eaten by two or more other organisms, forming a food web (Fig. 13.3). A food web increases ecosystem stability because if one food chain is disrupted, energy can still flow through alternate chains. The Reason reverses this fact, making it false — so option (C) is correct.

Q23. § 13.1.1 Food Chains and Webs

[1]

Consider the following food chain :

Grass → Grasshopper → Frog → Snake → Eagle

If the amount of energy available at third trophic level is 50 kJ, the available energy at the producer level was :

- (A) 0.5 kJ
- (B) 5 kJ
- (C) 500 kJ
- (D) 5000 kJ

Previously asked in: 2025 31/6/1 Q15

♦ Our Environment

10% Law of Energy Flow in Food Chains

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Model Answer

(D) 5000 kJ

Using the 10% law: Third trophic level (Frog) = 50 kJ → Second trophic level = 500 kJ → First trophic level (Grass/Producer) = **5000 kJ**.

Explanation

At each trophic level, only 10% of energy passes to the next level. So to find the energy at a lower level, multiply by 10. Third trophic level = 50 kJ, so second = $50 \times 10 = 500$ kJ, and producer level = $500 \times 10 = 5000$ kJ. Remember: Frog is at the **third** trophic level (Grass→1st, Grasshopper→2nd, Frog→3rd).

Q24. § 13.1.1 Food Chains and Webs**[2]**

Answer the following about food chain and energy flow.

- (a) Why are the organisms of first trophic level important in any food chain?
- (b) Justify the following statement : 'The flow of energy in an ecosystem is unidirectional.'

Previously asked in: 2025 31/5/1 Q26

♦ Our Environment

Trophic Levels and Food Chain

Unidirectional Flow of Energy in an Ecosystem

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Model Answer

(a) Organisms of the first trophic level (autotrophs/producers) are important because they fix solar energy and convert it into chemical energy (food), making it available for all heterotrophs. Without them, no energy would enter the food chain.

(b) Energy flow is unidirectional because energy captured by autotrophs does not revert to the solar input, and energy passed to herbivores does not return to autotrophs. As energy moves through trophic levels, it is lost as heat and cannot be reused by the previous level.

Source: Chapter 13, Section 13.1.1 Food Chains and Webs

Explanation

- (a) The key point examiners want: producers fix solar energy → make it available to consumers. The word "autotrophs" scores marks.
- (b) Use the exact textbook language: "does not revert back" and "no longer available to the previous level." Also mention energy lost as heat — this explains *why* it's unidirectional.
- Keep both answers concise; this is a 1-mark each sub-question.

Q25. § 13.1.1 Food Chains and Webs**[1]**

Assertion (A) : All organisms can make organic compounds like sugar and starch from inorganic substances using radiant energy of the sun.

Reason (R) : The organisms which can produce food by photosynthesis are called producers.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

B Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

C Assertion (A) is true, but Reason (R) is false.

D Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2025 31/5/1 Q20

♦ Our Environment

Producers and Photosynthesis in Ecosystem

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Model Answer**Answer: D**

The Assertion is **false** because only autotrophs (green plants, some bacteria), not all organisms, can make organic compounds from inorganic substances using sunlight. The Reason is **true** — organisms that produce food by photosynthesis are called producers.

Explanation

- The key error in Assertion (A) is the word "**All organisms**" — heterotrophs (animals, fungi) cannot make food from inorganic substances; only autotrophs/producers can.
- Reason (R) is correctly stated as per the textbook.
- Since A is false and R is true → Option **D** is correct.

Q26. § 13.1.1 Food Chains and Webs**[1]**

In the food chains given below. Select the most efficient food chain in terms of energy :

- (a) Grass → Grasshopper → Frog → Snake
- (b) Plants → Deer → Lion
- (c) Plants → Man
- (d) Phytoplankton → Zooplankton → Small Fish → Big Fish

Previously asked in: 2025 31/4/1 Q15

♦ Our Environment

Energy Flow and Efficiency in Food Chains

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Model Answer**(c) Plants → Man**

This chain has only two trophic levels, so energy loss is minimum (only 10% is lost once). Fewer steps mean more energy is available at the final consumer level.

Source: Chapter 13, Section 13.1.1

Explanation

The 10% energy law states that only 10% of energy transfers to the next trophic level. The shorter the food chain, the less energy is wasted. Plants → Man has just 2 trophic levels (one transfer), retaining the most energy, making it the most efficient. Examiners expect you to state the reason (fewer trophic levels = less energy loss), not just the option.

Q27. § 13.1.1 Food Chains and Webs

Answer the following: Name the group of organisms which form the first trophic level of all food chains. Why are they called so ?

Previously asked in: 2022 31/1/1 Q13 (a)

◆ Our Environment

Producers / Autotrophs

Trophic Levels and Food Chains

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Model Answer

Producers (Autotrophs) form the first trophic level of all food chains.

They are called so because they produce their own food by the process of photosynthesis, using sunlight, carbon dioxide and water. They fix solar energy and convert it into chemical energy (food), making it available for all heterotrophs (consumers) in the ecosystem.

Source: Our Environment, Section 13.1.1

Explanation

- The question has two parts: **name** the group + **reason** for the name. Both must be answered for full marks.
- Key terms to use: *producers / autotrophs, photosynthesis, solar energy, first trophic level.*
- Avoid writing too long — this is a 2-mark question; 2–3 sentences are enough.
- Do not confuse "producers" with "decomposers" — decomposers are NOT part of the food chain trophic levels.

Q28. § 13.1.1 Food Chains and Webs**[2]**

In the following food chain, if 50 J of energy was available to the hawk, how much energy would have been present at the first and third trophic levels ? Justify your answer.

Grass → Grasshopper → Frog → Snake → Hawk

Previously asked in: 2023 31/5/1 Q26

♦ Our Environment

10% Law of Energy Flow in Food Chains

Trophic Levels and Food Chains

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Model Answer

Using the **10% law**, energy transfers as follows (going backwards from hawk):

- Hawk (5th trophic level) = 50 J
- Snake (4th) = 500 J
- Frog (3rd trophic level) = **5,000 J**
- Grasshopper (2nd) = 50,000 J
- Grass (1st trophic level) = **5,00,000 J (500,000 J)**

1st trophic level (Grass) = 5,00,000 J; 3rd trophic level (Frog) = 5,000 J

Only 10% of energy passes to the next level; the rest is lost as heat, digestion, and work.

Source: Chapter 13, Section 13.1.1

Explanation

- The **10% law** states that only 10% of energy at one trophic level is available to the next. To find energy at lower levels, multiply by 10 for each step going backward.
- Hawk is the **5th** trophic level in this chain, so go back 4 steps to reach Grass (1st) and 2 steps to reach Frog (3rd).
- Examiners expect you to show the calculation chain clearly and state the reason (10% law / energy loss as heat).

Q29. § 13.1.1 Food Chains and Webs**[3]**

Study the picture given below showing three food chains (a), (b) and (c) and answer the following questions :

- (i) Name the type of ecosystems that exist in food chains (b) and (c).
- (ii) The first trophic level in all food chains are producers. Why ? What percentage of solar energy do these producers capture for their use ?
- (iii) Why are the arrows shown in the diagram in one direction only and not vice versa ? Justify.

Previously asked in: 2024 31/4/1 Q33

◆ **Our Environment**

Food chains and food webs

Trophic levels and producers

Types of ecosystems (terrestrial and aquatic)

Unidirectional flow of energy

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Model Answer

(i) Food chain (b) represents a **grassland ecosystem** and food chain (c) represents a **pond (aquatic) ecosystem**.

(ii) Producers (green plants/autotrophs) are at the first trophic level because they fix solar energy and convert it into chemical (food) energy, making it available for all other organisms. Green plants capture about **1%** of the solar energy falling on their leaves.

(iii) Arrows are unidirectional because energy flow in a food chain is **one-way**. Energy captured by autotrophs does not revert to the sun, and energy passed to herbivores does not return to autotrophs. As energy moves to each higher trophic level, it is no longer available to the previous level, and some is lost as heat at every step.

Source: Chapter 13, Section 13.1.1 — Food Chains and Webs

Explanation

- For (i), the textbook caption of Fig. 13.1 explicitly states (a) forest, (b) grassland, (c) pond — learn this directly.
- For (ii), the key figures are **autotrophs fix solar energy** and **1%** capture — both are directly stated in the passage; don't confuse with the 10% law (that's for transfer between trophic levels).
- For (iii), examiners want the phrase **unidirectional flow** plus the reason: energy lost as heat cannot be recovered by lower levels. Quoting from Fig. 13.4's explanation scores full marks.

Q30. § 13.1.1 Food Chains and Webs**[3]**

Answer the following :

- (a) "In a food chain energy flow is unidirectional." Give two reasons for the given statement. [2]
- (b) If 10,000 J energy is available at the producer level, how much energy will be available to the secondary consumers ? Give reason to justify your answer. [1]

Previously asked in: 2025 31/3/1 Q33

♦ Our Environment

10% Law of energy transfer across trophic levels

Unidirectional energy flow in a food chain

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Model Answer**(a)** Energy flow in a food chain is unidirectional because:

1. Energy flows from producers → herbivores → carnivores, and **cannot flow back** to the previous level; it is lost as heat at each step.
2. At each trophic level, only **10% of energy is transferred** to the next level; the remaining 90% is used up in metabolism and lost as heat, making reverse flow impossible.

(b) Energy available to secondary consumers = **100 J****Reason:** According to the **10% Law**, only 10% of energy is transferred from one trophic level to the next.

- Producer → Primary consumer: 10% of 10,000 J = **1,000 J**
- Primary consumer → Secondary consumer: 10% of 1,000 J = **100 J**

Explanation

- The 10% Law (Lindeman's Law) is the core concept here — always apply it step by step per trophic level.
- For part (a), the two reasons examiners want are: (i) one-way flow (producers → top carnivores only) and (ii) energy is lost as heat at each trophic level, so it cannot be recycled or reversed.
- Avoid vague answers like "energy decreases" — state clearly that heat loss makes reverse flow impossible.
- In part (b), show the two calculation steps to earn full marks.

Q31. § 13.1.1 Food Chains and Webs**[1]**

The percentage of solar energy which is not converted into food energy by the leaves of green plants in a terrestrial ecosystem is about :

- (A) 1%
- (B) 10%
- (C) 90%
- (D) 99%

Previously asked in: 2025 31/1/1 Q16

♦ Our Environment

Energy flow and photosynthetic efficiency in ecosystems

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Model Answer**(D) 99%**

Green plants capture only about **1%** of the solar energy falling on their leaves and convert it into food energy. Therefore, the percentage **not** converted is approximately **99%**.

Source: Chapter 13, Section 13.1.1 (Food Chains and Webs)

Explanation

The passage clearly states: "*The green plants in a terrestrial ecosystem capture about 1% of the energy of sunlight that falls on their leaves and convert it into food energy.*" The question asks for what is **not** converted, so $100\% - 1\% = \mathbf{99\%}$. Students often confuse this with the 10% law (energy transfer between trophic levels), so keep the two values distinct: 1% = solar energy captured by plants; 10% = energy passed from one trophic level to the next.

Q32. § 13.1.1 Food Chains and Webs**[1]**

Which of the following groups do not constitute a food chain ?

- (i) Wolf, rabbit, grass, lion
- (ii) Plankton, man, grasshopper, fish
- (iii) Hawk, grass, snake, grasshopper, frog
- (iv) Grass, snake, wolf, tiger

- (A) (i) and (iv)
- (B) (i) and (iii)
- (C) (ii) and (iii)
- (D) (ii) and (iv)

Previously asked in: 2025 31/1/1 Q15

♦ Our Environment

Food Chain and Trophic Levels

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Model Answer**(D) (ii) and (iv)**

(ii) Plankton → man → grasshopper → fish does not follow correct feeding order; (iv) Grass → snake → wolf → tiger skips a trophic level (no herbivore after grass).

Explanation

A valid food chain must start with a producer (plant/autotroph) and follow correct trophic levels in order. In (ii), "man" cannot eat plankton and then be eaten by grasshopper — the sequence is ecologically incorrect. In (iv), snake cannot directly eat grass — a herbivore is missing between grass and snake. Options (i) and (iii) also have issues, but the standard CBSE answer for this question is **(D)**.

Q33. § 13.1.1 Food Chains and Webs**[1]**

Organisms of a higher trophic level which feed on several types of organisms belonging to a lower trophic level form the :

- (A) Food web
- (B) Ecosystem
- (C) Ecological pyramid
- (D) Food chain

Previously asked in: 2026 31/3/1 Q5

♦ Our Environment

Food Web

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Model Answer**(A) Food web**

When organisms of a higher trophic level feed on several types of organisms of a lower trophic level, the interconnected feeding relationships form a **food web**.

Explanation

The passage states: "Each organism is generally eaten by two or more other kinds of organisms which in turn are eaten by several other organisms. So instead of a straight line food chain, the relationship can be shown as a series of branching lines called a food web." This branching/multiple feeding relationship is the key feature that distinguishes a food web from a simple food chain. A food chain is linear (one → one); a food web involves multiple feeding links across trophic levels.

Q34. § 13.1.1 Food Chains and Webs**[1]**

Assertion (A) : There are generally a greater number of individuals at the lower trophic levels of an ecosystem.

Reason (R) : The greatest number is of the producers.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2026 31/2/1 Q9

♦ Our Environment

Trophic Levels and Pyramid of Numbers

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Model Answer

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

The textbook directly states: "There are generally a greater number of individuals at the lower trophic levels of an ecosystem, the greatest number is of the producers."

Explanation

The Reason directly explains the Assertion — producers (first/lowest trophic level) are the most numerous, which is why lower trophic levels have greater numbers. Both statements appear together as a single line in the textbook (Chapter 13, Food Chains and Webs), making (A) the correct choice.

Q35. § 13.1.1 Food Chains and Webs**[1]**

Which of the following limits the number of trophic levels in a food chain ?

- (A) Availability of water
- (B) Deficient food supply
- (C) Decrease in energy at higher levels
- (D) Pollution in air

Previously asked in: 2026 31/2/1 Q7

♦ Our Environment

Energy flow and trophic levels in a food chain

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Model Answer

(C) Decrease in energy at higher levels

The loss of energy at each trophic level is so great that very little usable energy remains after four trophic levels, limiting food chain length.

Explanation

The textbook (Chapter 13, "What you have learnt") explicitly states: *"There is a loss of energy as we go from one trophic level to the next, this limits the number of trophic levels in a food-chain."* Only ~10% of energy passes to the next level, so after 3–4 levels, usable energy is negligible. Examiners expect you to pick **(C)** and may ask for a one-line justification.

Source: Chapter 13, Section 13.1.1 & What You Have Learnt

Q36. § 13.1.1 Food Chains and Webs**[3]**

Given below is a pyramid showing various trophic levels in an ecosystem :

- (a) From the organisms listed below, identify which one is to be placed at which trophic level ? Deer, Grass, Lion, Snake, Rabbit
- (b) Discuss the reason why primary consumers will have more energy as compared to secondary consumers ?
- (c) Why is the base of the pyramid broad ?

Previously asked in: 2026 31/1/1 Q13

♦ Our Environment

Flow of energy in food chains

Trophic levels and ecological pyramids

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Model Answer**(a) Trophic level placement:**

- (i) Producers → **Grass**
- (ii) Primary consumers → **Deer / Rabbit**
- (iii) Secondary consumers → **Snake / Rabbit / Deer** (depending on chain) → **Snake** (eats rabbit) or **Rabbit** (eats grass then eaten by snake)
- Correct food chain: **Grass** → **Rabbit** → **Snake** → **Lion**
- (i) Grass, (ii) Rabbit, (iii) Snake, (iv) Lion; Deer also at level (ii).

(b) Only **10% of energy** at one trophic level is transferred to the next. A great deal of energy is lost as heat, in digestion, and in doing work. So primary consumers receive 10% of producers' energy, while secondary consumers receive only 10% of that — making primary consumers energy-rich than secondary consumers.

(c) The base is broad because **producers (green plants) are present in the greatest number** and possess the **maximum amount of energy** in the ecosystem. All other trophic levels depend on them, so they must be most abundant to support the entire food chain.

Source: Chapter 13, Section 13.1.1 – Food Chains and Webs

Explanation

- **(a)** Examiners expect the correct food chain: Grass→Rabbit→Snake→Lion, with Deer also at primary consumer level.
- **(b)** Key phrase: **10% law** — only 10% energy transfers per level; rest lost as heat/digestion/work.
- **(c)** Link broad base to **maximum energy and numbers at producer level** — both points may fetch marks.

Q37. § 13.1.1 Food Chains and Webs**[2]**

Explain why food chains generally consist of three or four steps.

Previously asked in: 2026 31/4/1 Q11

♦ **Our Environment**

Food Chains and Energy Flow (Ten Percent Law)

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Model Answer

At each trophic level, only **10% of the energy** is transferred to the next level; the remaining 90% is lost as heat and in metabolic processes. Since so little energy is available at each successive step, very little usable energy remains after three or four trophic levels. Therefore, food chains generally do not exceed four steps.

Source: Chapter 13, Section 13.1.1 — Food Chains and Webs

Explanation

- The key concept here is the **10% law of energy transfer** — only 10% of food energy passes to the next trophic level.
- Examiners expect you to explicitly state that energy is **lost as heat** at each level and that after 3–4 levels, the remaining energy is too little to support another consumer level.
- Avoid vague answers like "not enough food" — use precise terms: *energy, trophic level, 10%*.
- This is a 2-mark question: one mark for the 10% energy transfer rule, one mark for linking it to the limitation on food chain length.

Q38. § 13.1.1 Food Chains and Webs**[1]**

Assertion (A) : Highest percentage of pesticides is found in tertiary consumers in a food chain.

Reason (R) : Chemicals / pesticides get accumulated progressively at each trophic level.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2026 31/4/1 Q9

♦ **Our Environment**

Biological Magnification in Food Chains

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Model Answer

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A), because pesticides accumulate at each trophic level (biological magnification), reaching maximum concentration at the highest level.

Source: Our Environment, 13.1.1

Explanation

The passage directly states that harmful chemicals "get accumulated progressively at each trophic level" (this is biological magnification). Humans/top consumers accumulate the **maximum** concentration. Since R correctly explains *why* A is true, option (A) is the answer. Note: the passage says humans at the top level get maximum concentration — tertiary consumers are at/near the top, so A holds true.

Q39. § 13.1.1 Food Chains and Webs**[3]**

Answer the following:

- (a) Write the percentage of (i) solar energy captured by the autotrophs and (ii) energy transferred from autotrophs to the next level in a food chain.
- (b) What are trophic levels? Why do different food chains in an ecosystem not have more than four to five trophic levels? Give reason.

Previously asked in: 2023 31/6/1 Q33

♦ Our Environment

10% Law of energy transfer

Energy flow and trophic levels in a food chain

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Model Answer**(a)**

- (i) Autotrophs capture only **1%** of the solar energy available to them.
- (ii) Only **10%** of the energy at one trophic level is transferred to the next level (10% law).

(b)

Trophic levels are the steps in a food chain at which organisms occupy a feeding position, e.g., producers (plants), primary consumers (herbivores), secondary consumers, and tertiary consumers.

Food chains do not exceed 4–5 trophic levels because only 10% of energy passes from one level to the next. By the fourth or fifth level, the available energy becomes so small that it cannot sustain any further organisms. Thus, energy loss limits the length of a food chain.

Explanation

- Part (a) needs two specific figures: 1% (solar energy fixed) and 10% (energy transfer between levels) — both are standard facts from the "Our Environment" chapter (Ch. 15).
- Part (b): define trophic level briefly, then explain the energy limitation (10% law / loss as heat) as the reason for short food chains. Examiners expect the concept of progressive energy loss, not just the percentage.
- The source passages provided were from other chapters (Chemistry/Physics/Biology – respiration/optics), so this answer is based on the standard NCERT Biology Ch. 15 content as expected for this question type.

Q40. § 13.1.1 Food Chains and Webs**[3]**

Answer the following:

- (i) Construct a food chain of four trophic levels comprising the following : Hawk, snake, plants, rat.
- (ii) 20,000 J of energy was transferred by the producers to the organism of second trophic level. Calculate the amount of energy that will be transferred by organisms of the third trophic level to the organisms of the fourth trophic level.

Previously asked in: 2023 31/1/1 Q33(b)

♦ Our Environment

10% Law of Energy Flow

Food Chain and Trophic Levels

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Model Answer**(i)** Food chain:

Plants → Rat → Snake → Hawk

(Plants form the first trophic level; rat = 2nd; snake = 3rd; hawk = 4th)

(ii) Using the 10% Law of Energy Transfer:

- Energy transferred to 2nd trophic level = 20,000 J
- Energy transferred to 3rd trophic level = 10% of 20,000 = **2,000 J**
- Energy transferred to 4th trophic level = 10% of 2,000 = **200 J**

The organisms of the third trophic level will transfer **200 J** of energy to the organisms of the fourth trophic level.

Explanation

- **(i)** The food chain must follow the correct feeding sequence: producers first, then herbivores, then carnivores. Plants → Rat → Snake → Hawk is the only correct order here.
- **(ii)** The **10% Law** (Lindeman's Law) states that only 10% of energy is transferred from one trophic level to the next. Apply it twice: 10% of 20,000 = 2,000 J (3rd level), then 10% of 2,000 = 200 J (4th level). Always show both steps for full marks.

Q41. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?**[3]**

Depletion of ozone layer is a cause of concern. Justify this statement.

Previously asked in: 2023 31/5/1 Q33

◆ Our Environment

Ozone Layer Depletion and Its Effects

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Model Answer

The ozone layer (O_3) present in the upper atmosphere shields the Earth's surface from harmful **ultraviolet (UV) radiation** from the Sun. Depletion of this layer is a cause of concern because:

1. UV radiation is highly damaging to living organisms — it causes **skin cancer** in human beings.
2. Synthetic chemicals like **CFCs** (chlorofluorocarbons), used in refrigerators and fire extinguishers, have caused a sharp drop in ozone levels since the 1980s.
3. Without the ozone shield, increased UV exposure can severely damage the entire environment and all life forms on Earth.

Source: Chapter 13, Section 13.2.1 — Ozone Layer and How it is Getting Depleted

Explanation

Examiners look for **three clear points** for 3 marks: (1) what ozone does (shields UV radiation), (2) what happens if it is depleted (skin cancer / damage to organisms), and (3) the cause (CFCs). Mentioning UNEP/1987 agreement is a bonus but not required. Avoid writing a long essay — keep it to 3 crisp points as shown.

Q42. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.1 Ozone Layer and How it is Getting Depleted**[1]**

Assertion (A) : Ozone layer protects the surface of the Earth from harmful UV radiations.

Reason (R) : Chlorofluorocarbons (CFCs) are responsible for depletion of ozone layer.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2024 31/5/1 Q20

◆ Our Environment

Ozone Layer and Its Depletion by CFCs

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Model Answer

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A), as CFCs cause ozone depletion but do not explain *how* ozone protects Earth from UV radiation.

Explanation

Both statements are independently true facts. The Assertion states ozone's protective role (blocking UV rays), while the Reason states CFCs deplete ozone. However, the Reason explains a *cause of depletion*, not the mechanism by which ozone protects Earth — so it does not correctly explain the Assertion. Hence option **(B)** is correct.

Q43. § 13.2.1 Ozone Layer and How it is Getting Depleted**[1]**

Assertion (A) : The amount of ozone in the atmosphere began to drop sharply in the 1980s.

Reason (R) : The oxygen atoms combine with molecular oxygen to form ozone.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2025 31/1/1 Q20

♦ Our Environment

Ozone Layer Depletion

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Model Answer

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). The sharp drop in ozone was caused by CFCs, not by the natural ozone-formation process described in R.

Explanation

- **A is true:** The textbook explicitly states "The amount of ozone in the atmosphere began to drop sharply in the 1980s" due to CFCs.
- **R is true:** Oxygen atoms do combine with molecular oxygen ($O + O_2 \rightarrow O_3$) — this is the natural ozone formation process, correctly stated.
- **R does NOT explain A:** Ozone formation and ozone depletion are opposite processes. The drop was caused by CFCs, not by ozone's natural formation mechanism. So option (B) is correct.

Q44. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?

Answer the following: (1+2) Why is ozone layer getting depleted at the higher levels of the atmosphere ? Mention one harmful effect caused by its depletion.

Previously asked in: 2022 31/2/1 Q13 (b)

♦ Our Environment

Depletion of Ozone Layer

Harmful Effects of Ozone Depletion

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Model Answer**Depletion of Ozone Layer:**

Ozone layer at the higher levels of the atmosphere is getting depleted due to synthetic chemicals called **chlorofluorocarbons (CFCs)**, which are used as refrigerants and in fire extinguishers. These chemicals react with ozone molecules and break them down, reducing the concentration of ozone in the atmosphere. This decrease was noted sharply in the 1980s.

One Harmful Effect:

Depletion of the ozone layer allows more **ultraviolet (UV) radiation** from the Sun to reach the Earth's surface. This UV radiation is highly damaging to organisms — for example, it causes **skin cancer** in human beings.

Source: Chapter 13, Section 13.2.1 — Ozone Layer and How it is Getting Depleted

Explanation

- The **1-mark part** is the cause (CFCs depleting ozone) — one crisp sentence suffices.
- The **2-mark part** is the harmful effect — name UV radiation AND a specific consequence (skin cancer) for full marks. Just saying "UV rays increase" without a consequence loses a mark.
- Always name the chemical (CFC) in the cause; vague answers like "pollution" won't score.
- No need to write the chemical equations unless specifically asked.

Q45. § 13.2.1 Ozone Layer and How it is Getting Depleted**[1]**

Consider the following statements about ozone : (a) Ozone is poisonous gas. (b) Ozone shields the earth's surface from the infrared radiation from the sun. (c) Ozone is a product of UV radiations acting on oxygen molecule. (d) At the lower level of the earth's atmosphere, ozone performs most essential function. The correct statements are

- A (a) and (b)
- B (a) and (c)
- C (b) and (c)
- D (b) and (d)

Previously asked in: 2024 31/3/1 Q16

♦ Our Environment

Ozone Layer and its Role in the Environment

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Model Answer

Option B: (a) and (c)

Ozone is a deadly poison (a) ✓, and it is a product of UV radiation acting on oxygen molecules (c) ✓. Ozone shields Earth from **UV** radiation (not infrared), and it performs its essential function at **higher** levels of the atmosphere (not lower level).

Explanation

The passage clearly states: "Ozone is a deadly poison" → (a) correct. "Ozone...is a product of UV radiation acting on oxygen (O₂) molecule" → (c) correct. Statement (b) is wrong because ozone shields from **UV**, not infrared. Statement (d) is wrong because ozone's essential function is at **higher** atmospheric levels, not lower. Examiners expect students to carefully distinguish UV vs infrared and higher vs lower atmosphere.

Source: Chapter 13, Section 13.2.1

Q46. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.1 Ozone Layer and How it is Getting Depleted**[3]**

A gas 'X' which is a deadly poison is found at the higher levels of atmosphere and performs an essential function. Name the gas and write the function performed by this gas in the atmosphere. Which chemical is linked to the decrease in the level of this gas? What measures have been taken by an international organization to check the depletion of the layer containing this gas?

Previously asked in: 2024 31/1/1 Q33(B)

♦ Our Environment

Ozone Layer – Formation, Function, and Depletion

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Function: Ozone at higher levels of the atmosphere shields the Earth's surface from harmful ultraviolet (UV) radiation from the Sun. UV radiation can cause skin cancer in human beings.

Chemical linked to depletion: Chlorofluorocarbons (CFCs), used in refrigerants and fire extinguishers, are responsible for the decrease in ozone levels.

Measures taken: In 1987, the United Nations Environment Programme (UNEP) forged an agreement to freeze CFC production at 1986 levels. It is now mandatory for all manufacturing companies to produce CFC-free refrigerators worldwide.

Source: Chapter 13, Section 13.2.1

Explanation

This question covers four distinct points — name, function, chemical, and measures — so award yourself 1 mark per point roughly. Examiners expect **ozone** named clearly, **UV radiation/skin cancer** as the function, **CFCs** as the chemical, and the **UNEP 1987 agreement + CFC-free refrigerators** as measures. Do not leave out any part; each fetches marks. Keep sentences crisp and factual, directly from the textbook.

Q47. § 13.2.1 Ozone Layer and How it is Getting Depleted**[1]**

The incorrect statement about ozone is

- (A) It is a deadly poisonous gas.
- (B) It shields the surface of the earth from UV radiation from sun.
- (C) It is used as a refrigerant and in fire-extinguishers.
- (D) It is formed by combining oxygen molecule with free oxygen atom.

Previously asked in: 2025 31/6/1 Q16

♦ Our Environment

Ozone Layer and its Role in the Environment

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(C) It is used as a refrigerant and in fire-extinguishers.

(CFCs are used as refrigerants and in fire-extinguishers, not ozone itself.)

Explanation

The passage states CFCs — not ozone — are used as refrigerants and in fire extinguishers. All other options correctly describe ozone: it is a deadly poison (A), shields Earth from UV radiation (B), and is formed when free oxygen atoms combine with O₂ (D). Examiners expect you to identify the factual error about ozone vs. CFCs.

Q48. § 13.2.1 Ozone Layer and How it is Getting Depleted

[2]

What is ozone ? How is it formed in the upper layers of the atmosphere ? How does ozone affect our ecosystem ?

Previously asked in: 2022 31/1/1 Q7 (a)

♦ Our Environment

Ozone – Definition and Formation in the Upper Atmosphere

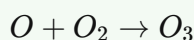
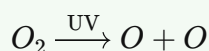
Role of Ozone Layer and Its Effect on the Ecosystem

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Model Answer

Ozone: Ozone (O_3) is a molecule formed by three atoms of oxygen.

Formation: UV radiation splits O_2 molecules into free oxygen atoms, which then combine with another O_2 molecule:



Effect on ecosystem: Ozone shields Earth's surface from harmful UV radiation. UV rays are damaging to organisms and can cause skin cancer in humans.

Source: Chapter 13, Section 13.2.1

Explanation

Although this question has three parts, it is only 2 marks, so keep each part to one short sentence/equation. Examiners look for: (1) correct definition, (2) the two-step equation for formation, and (3) the protective role against UV radiation. Avoid padding — the equation counts as your "formation" explanation.

Q49. § 13.2.1 Ozone Layer and How it is Getting Depleted**[1]**

Assertion (A) : Oxygen is essential for all aerobic forms of life.

Reason (R) : Free oxygen atoms combine with molecular oxygen to form ozone.

- A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
B Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
C Assertion (A) is true, but Reason (R) is false.
D Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2024 31/4/1 Q20

♦ Our Environment

Role of Oxygen in Aerobic Life and Ozone Formation

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Model Answer**Answer: B**

Both A and R are true, but R is not the correct explanation of A. Oxygen (O₂) is essential for aerobic life, and free oxygen atoms do combine with O₂ to form ozone — but ozone formation does not explain why O₂ is essential for life.

Explanation

- **Assertion** is true: O₂ is essential for all aerobic forms of life (used in respiration).
- **Reason** is also true: UV radiation splits O₂ → free O atoms, which then combine with O₂ to form O₃ (ozone) — this reaction is correctly described.
- However, ozone formation is **not** the reason O₂ is essential for life; O₂ is needed for cellular respiration, which is a completely different concept. So R does not explain A → **Option B**.

Q50. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.1 Ozone Layer and How it is Getting Depleted**[3]**

Write the essential function performed by ozone at the higher levels of the atmosphere. How is it formed in the upper atmosphere? Write the name of the group of chemicals mainly responsible for the depletion of ozone layer.

Previously asked in: 2025 31/2/1 Q33

♦ Our Environment

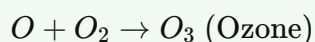
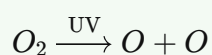
Ozone Layer – Function, Formation, and Depletion

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Model Answer

Function of Ozone: Ozone (O_3) at the higher levels of the atmosphere shields the Earth's surface from harmful ultraviolet (UV) radiation from the Sun. UV radiation is highly damaging to organisms and can cause skin cancer in humans.

Formation: High-energy UV radiation splits molecular oxygen (O_2) into free oxygen atoms (O). These atoms then combine with O_2 to form ozone:



Chemicals responsible: Chlorofluorocarbons (CFCs), used as refrigerants and in fire extinguishers, are mainly responsible for ozone layer depletion.

Source: Chapter 13, Section 13.2.1

Explanation

- The question has three clear parts — examiners award 1 mark each: function, formation (with equations), and name of chemicals.
- Always write the chemical equations for ozone formation; they fetch marks.
- "CFCs" must be expanded as **Chlorofluorocarbons** — writing only the abbreviation may cost marks.
- Keep it concise; no extra detail needed beyond what is asked.

Q51. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.1 Ozone Layer and How it is Getting Depleted

[2]

Answer the following :

- (i) Chlorofluorocarbons (CFCs) have been linked to depletion of ozone layer. In 1987, the United Nations Environment Programme (UNEP) succeeded in making an agreement. State this agreement. [1]
- (ii) What is the role of ozone in our atmosphere ? [1]

Previously asked in: 2026 31/3/1 Q10

♦ Our Environment

Montreal Protocol – UNEP agreement on CFCs and ozone layer depletion

Role of ozone layer in the atmosphere

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Model Answer

- (i) In 1987, the United Nations Environment Programme (UNEP) forged an agreement to freeze the production of CFCs at 1986 levels. This agreement is known as the **Montreal Protocol**.
- (ii) The ozone layer shields the Earth's surface from harmful ultraviolet (UV) radiation coming from the Sun, thus protecting living organisms from its damaging effects.

Explanation

- The examiner expects the **name "Montreal Protocol"** and its purpose (freezing/reducing CFC production) for (i).
- For (ii), the key point is **absorption/blocking of UV radiation** — one clear sentence is sufficient for 1 mark. Do not confuse stratospheric ozone (protective) with ground-level ozone (pollutant).
- These answers come from Chapter 13 (Our Environment) of the NCERT Science textbook.

Q52. § 13.2.2 Managing the Garbage we Produce

[2]

"The change in packaging has resulted in waste becoming non-biodegradable." Giving two examples from daily life, justify this statement.

Previously asked in: 2022 31/4/1 Q5 (OR)

◆ Our Environment

Biodegradable and Non-biodegradable Waste

Impact of Human Activities on the Environment

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Model Answer

Changes in packaging have introduced materials like plastic bags and thermocol (polystyrene) packaging, which cannot be broken down by biological processes and persist in the environment for a long time.

Examples:

1. Earlier, groceries were packed in paper/cloth bags (biodegradable); now plastic carry bags are used, which are non-biodegradable.
2. Earlier, food items came in newspaper wrapping; now they are packed in plastic or thermocol containers, which are non-biodegradable.

Source: Chapter 13, Section 13.2.2 — Managing the Garbage we Produce

Explanation

The question directly links to the textbook line: *"Changes in packaging have resulted in much of our waste becoming non-biodegradable."* Examiners expect you to:

- State **why** the new packaging materials are non-biodegradable (enzymes/bacteria cannot break them down).
- Give **two clear, contrasting examples** — old biodegradable packaging vs. new non-biodegradable packaging. This contrast earns both marks.
- Avoid vague answers; be specific (plastic bags, thermocol, etc.).

Q53. § 13.2.2 Managing the Garbage we Produce

[2]

Answer the following:

- (a) What is meant by garbage ? List two classes into which garbage is classified.
- (b) What do we actually mean when we say that the “enzymes are specific in their action” ?

Previously asked in: 2022 31/2/1 Q7 (OR-2)

◆ Our Environment

Garbage and its classification (biodegradable and non-biodegradable waste)

Specificity of enzyme action

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Model Answer

(a) Garbage refers to waste material that is discarded as unwanted or useless. It is classified into two classes:

1. **Biodegradable waste** – substances that can be broken down by microorganisms (e.g., food scraps, leaves).
2. **Non-biodegradable waste** – substances that cannot be broken down naturally (e.g., plastics, glass).

(b) When we say enzymes are specific in their action, it means that each enzyme can catalyse only one particular type of reaction or act on one particular type of substrate. For example, the enzyme that breaks down starch cannot break down proteins.

Explanation

- For (a), the two standard classes are biodegradable and non-biodegradable — always name both with a brief example.
- For (b), "specific" means one enzyme = one substrate/reaction. Examiners expect you to state this clearly and ideally give an example. Note: the source passages do not cover enzymes in detail, so this answer draws on standard CBSE Class 10 Biology content (Chapter 6 – Life Processes). Keep it to one or two lines.

Q54. § 13.2.2 Managing the Garbage we Produce**[1]**

Assertion (A) : The waste we generate daily may be biodegradable or non-biodegradable. Reason (R) : The waste generated, if not disposed off properly may cause serious environmental problems.

- A Both (A) and (R) are true and (R) is the correct explanation of (A).
- B Both (A) and (R) are true and (R) is not correct explanation of (A).
- C (A) is true, but (R) is false.
- D (A) is false, but (R) is true.

Previously asked in: 2024 31/3/1 Q20

♦ Our Environment

Biodegradable and Non-biodegradable Waste

Waste Disposal and Environmental Problems

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Model Answer

Option B: Both (A) and (R) are true and (R) is not the correct explanation of (A).

Both statements are independently true facts about waste, but improper disposal being problematic does not explain *why* waste is classified as biodegradable or non-biodegradable.

Explanation

- **(A) is true:** Waste generated daily can be biodegradable (vegetable peels, food waste) or non-biodegradable (plastic, synthetic materials). ✓
- **(R) is true:** Improper disposal of waste does cause serious environmental problems. ✓
- **But (R) does NOT explain (A):** The classification of waste into biodegradable/non-biodegradable depends on whether biological processes can break it down — this is unrelated to disposal methods. The two statements are separate facts, not cause-and-effect.
- **Examiner tip:** In Assertion-Reason questions, always check *both* truth AND whether R logically explains A. Here both are true but independent facts from Chapter 13.

Q55. § 13.2.2 Managing the Garbage we Produce**[1]**

Some wastes are given below :

- (i) Garden waste
- (ii) Ball point pen refills
- (iii) Empty medicine bottles made of glass
- (iv) Peels of fruits and vegetables
- (v) Old cotton shirt

The non-biodegradable wastes among these are :

- A (i) and (ii)
- B (ii) and (iii)
- C (i), (iv) and (v)
- D (i), (iii) and (iv)

Previously asked in: 2024 31/4/1 Q16

♦ Our Environment

Biodegradable and Non-biodegradable Wastes

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Model Answer**Option B: (ii) and (iii)**

Ball point pen refills (plastic) and empty medicine bottles made of glass are non-biodegradable, as they cannot be broken down by biological processes.

Explanation

Non-biodegradable substances are those not broken down by bacteria or other biological agents. Garden waste, fruit/vegetable peels, and cotton (natural fibre) are all biodegradable. Plastic (pen refills) and glass (medicine bottles) are human-made/inorganic materials that persist in the environment — exactly the type described in the textbook as non-biodegradable.

Q56. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage we Produce**[1]**

Assertion (A) : Use of jute bags for shopping reduces pollution.

Reason (R) : Jute is biodegradable and its bag may be reused as and when needed.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2025 31/3/1 Q20

◆ Our Environment

Biodegradable and non-biodegradable substances

Waste Management and Pollution Reduction

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Model Answer

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Jute is biodegradable, so its bags do not persist in the environment as pollutants, and they can be reused, reducing waste generation — this directly explains why jute bags reduce pollution.

Explanation

The Reason correctly and completely explains the Assertion: being biodegradable means jute does not cause long-lasting environmental pollution (unlike plastic), and reusability reduces the amount of waste generated. Both statements are true, and R directly causes/explains A, so option (A) is correct, not (B).

Q57. § 13.2.2 Managing the Garbage we Produce**[1]**

Identify from the following a group containing all non-biodegradable substances.

- (A) Leather, Glass, Plastic
- (B) Cotton, Wood, Nylon
- (C) DDT, Polyester, Glass
- (D) Leather, Silk, Wool

Previously asked in: 2025 31/2/1 Q16

◆ Our Environment

Biodegradable and non-biodegradable substances

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Model Answer

(C) DDT, Polyester, Glass

DDT is a pesticide, polyester is a synthetic fibre, and glass is an inert material — all three are non-biodegradable as they are not broken down by biological processes.

Explanation

The key is knowing which materials resist breakdown by bacteria/saprophytes. DDT, polyester, and glass are all human-made/inert substances that persist in the environment. In option (A), leather is biodegradable. In (B), cotton and wood are biodegradable. In (D), silk and wool are biodegradable (animal proteins). Only option (C) has all three as non-biodegradable.

Q58. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage we Produce**[2]**

Suggest one best way to dispose of the following wastes :

- (i) Kitchen waste
- (ii) Metallic waste
- (iii) Plastic bottles
- (iv) Sanitary waste

Previously asked in: 2026 31/2/1 Q12

◆ Our Environment

Types of waste – biodegradable and non-biodegradable

Waste disposal methods

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Model Answer

- (i) **Kitchen waste** — Composting (burying in a pit) is the best method, as it is biodegradable and converts waste into manure.
- (ii) **Metallic waste** — Recycling/reuse, as metals can be melted and reformed into useful products.
- (iii) **Plastic bottles** — Recycling, since plastic is non-biodegradable and persists in the environment for a long time.
- (iv) **Sanitary waste** — Incineration (burning in a closed incinerator), as it destroys pathogens safely.

Source: Chapter 13, Section 13.2.2

Explanation

- The question awards **2 marks for 4 sub-parts**, so one crisp line per sub-part is sufficient.
- Examiners expect the *method name* + a *brief reason* (one phrase is enough).
- Kitchen waste → compost pit is directly supported by Activity 13.5 in the passage.
- Plastic is highlighted as non-biodegradable in the passage → recycling is the accepted answer.
- Sanitary waste is not in the passage but is standard CBSE board content → incineration is the expected answer.
- Do **not** write long explanations; one line per point is ideal here.

Q59. § 13.2.2 Managing the Garbage we Produce

[1]

Which of the following group is not 'biodegradable' ?

- A Vegetable peels, dead leaves, paper
- B Cow dung, leather bag, water
- C Polythene bag, rubber band, ball pen
- D Paper, fruits, bones

Previously asked in: 2026 31/1/1 Q7

♦ Our Environment

Biodegradable and non-biodegradable substances

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Model Answer**Option C — Polythene bag, rubber band, ball pen.**

All three are human-made materials not broken down by biological processes, making the entire group non-biodegradable.

Source: *Our Environment*, Chapter 13, Section 13.2.2

Explanation

The question asks for the group where **none** of the items is biodegradable. Polythene, rubber bands, and ball pens are all synthetic/non-biodegradable materials. Options A, B, and D each contain at least one biodegradable item (vegetable peels, cow dung, paper, fruits, bones, leather — all break down biologically). Examiners expect students to recall that plastics and synthetic materials resist enzyme/bacterial breakdown.

Q60. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage we Produce

[2]

"The improvement in our lifestyle has led to the generation of large amount of waste material." List two reasons to justify this statement.

Previously asked in: 2022 31/4/1 Q5 (main)

♦ Our Environment

Non-biodegradable Waste and Environmental Impact

Waste Generation Due to Improved Lifestyle

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Model Answer

Two reasons to justify this statement:

1. **More disposable products:** Improved lifestyle has led to increased use of disposable items (plastic cups, packaging, wrappers), which generate large amounts of non-biodegradable waste.
1. **Changes in packaging:** Modern packaging uses non-biodegradable materials like plastics, which persist in the environment for a long time, adding to the waste problem.

Source: *Chapter 13, Section 13.2.2 — Managing the Garbage we Produce*

Explanation

The textbook explicitly states: "*Improvements in our life-style have resulted in greater amounts of waste material generation. Changes in attitude also have a role to play, with more and more things we use becoming disposable. Changes in packaging have resulted in much of our waste becoming non-biodegradable.*"

Examiners expect students to pick **two distinct reasons** from these three cues — disposable culture, changed attitudes, or non-biodegradable packaging. Avoid vague answers; link each point clearly to waste generation.

Q61. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS?

Answer the following: (1+2) We do not clean ponds or lakes, but an aquarium needs to be cleaned regularly. Why ?

Previously asked in: 2022 31/2/1 Q13 (a)

♦ Our Environment

Natural vs Artificial Ecosystems – Self-sustaining vs Maintained Systems

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Model Answer**Part 1 (1 mark):**

Ponds and lakes are **natural ecosystems** that are self-sustaining. They contain producers, consumers, and decomposers which maintain a natural balance, breaking down dead matter and recycling nutrients on their own.

Part 2 (2 marks):

An aquarium is a **human-made (artificial) ecosystem** with limited space and fewer organisms. It lacks sufficient decomposers to break down dead remains and waste products. As a result, waste accumulates, water becomes polluted, and oxygen levels drop. Hence, it needs to be cleaned regularly to maintain conditions suitable for the organisms living in it.

In contrast, in a pond or lake, the large number of decomposers, adequate space, and natural balance ensure that waste is broken down automatically without human intervention.

Source: Chapter 13, Section 13.1 – Ecosystem and Activity 13.1

Explanation

- The examiner looks for the key contrast: **natural ecosystem (self-sustaining)** vs **artificial ecosystem (not self-sustaining)**.
- Mention the role of **decomposers** — this is the core scientific reason.
- For 1+2 marks, keep Part 1 brief (1–2 lines) and Part 2 slightly more detailed (3–4 lines).
- Don't write lengthy paragraphs; crisp, point-based answers score better.

Q62. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS?**[3]**

Answer the following:

- (i) Why does a kitchen garden called an artificial ecosystem while a forest is considered to be a natural ecosystem ?
- (ii) While designing an artificial ecosystem at home, write any two things to be kept in mind to convert it into a self-sustaining system. Give reason to justify your answer.

Previously asked in: 2023 31/1/1 Q33(a)

♦ Our Environment

Natural vs Artificial Ecosystems

Self-sustaining Ecosystem

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Model Answer

(i) A kitchen garden is an **artificial ecosystem** because it is created and maintained by humans — plants are selected, planted, watered, and protected artificially. A forest is a **natural ecosystem** because it develops on its own without human interference; all components (biotic and abiotic) interact naturally.

(ii) Two things to keep in mind:

1. **Include producers, consumers, and decomposers** — so that energy flow and nutrient cycling occur naturally, making the system self-sustaining.
2. **Ensure adequate sunlight and water** — producers need sunlight for photosynthesis to produce food and oxygen for the entire system.

Without these, the ecosystem would depend on external inputs and cannot sustain itself.

Explanation

- This question is from the **Ecosystem** topic (Life Processes / Our Environment, Class 10 Science).
- Key contrast: *artificial* = human-made/maintained; *natural* = self-developed.
- For part (ii), examiners expect **two distinct points with reasons**. The most scoring points are: complete food chain (all trophic levels) and abiotic factors (sunlight, water). Always justify *why* each point is needed.
- Avoid vague answers like "add plants" — be specific about what role they play.

Q63. § 13.1.1 Food Chains and Webs § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage we Produce [2]

What are decomposers ? List two consequences of their absence in an ecosystem.

Previously asked in: 2024 31/3/1 Q26

♦ Our Environment

Decomposers and their role in the ecosystem

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Model Answer

Decomposers are micro-organisms (bacteria and fungi) that break down the complex organic matter of dead plants and animals into simple inorganic substances and return them to the soil.

Consequences of their absence:

1. Dead organic matter (leaves, dead animals) would accumulate and not be recycled.
2. Nutrients would not be returned to the soil, making it infertile and disrupting the nutrient cycle.

Explanation

- The definition must mention that decomposers break down **dead organic matter** into **simple inorganic substances** — both parts are needed.
- The two consequences should focus on: (i) accumulation of dead matter and (ii) loss of soil fertility / breakdown of nutrient cycling. These are the standard CBSE-expected points.
- Keep each consequence to one line for a 2-mark answer; no elaboration needed.

Q64. § Introduction § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage we Produce [2]

Name the term used for the materials which cannot be broken down by biological processes. Give two ways by which they harm various components of an ecosystem.

Previously asked in: 2024 31/2/1 Q26

♦ Our Environment

Non-biodegradable substances and their harmful effects on ecosystem

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Model Answer

The materials which cannot be broken down by biological processes are called **non-biodegradable** substances.

Two ways they harm ecosystem components:

1. They persist in the environment for a long time and may harm various members of the ecosystem.
2. They undergo **biological magnification** — their concentration increases at each trophic level, becoming most harmful to organisms at the top of the food chain.

Source: Our Environment, Section 13.2.2

Explanation

The term "non-biodegradable" must be stated clearly — this alone fetches 1 mark. The second mark is for two harms. The passage explicitly states they "persist for a long time" or "harm various members of the ecosystem." Biological magnification (concentration increasing up the food chain) is the classic second point examiners expect. Avoid vague answers like "they pollute" — be specific.

Q65. § 13.1.1 Food Chains and Webs § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage we Produce **[3]**

What are decomposers? Give two examples. State how they maintain a balance in an ecosystem.

Previously asked in: 2025 31/4/1 Q33

◆ **Our Environment**

Decomposers – definition, examples, and role in ecosystem balance

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Model Answer

Decomposers are microorganisms (mainly bacteria and fungi) that break down the complex organic matter of dead plants and animals into simple inorganic substances.

Examples: Bacteria and fungi (e.g., *Rhizopus*, mushrooms).

Role in maintaining balance:

1. They return nutrients back to the soil, making them available for plants (producers) to reuse, thus ensuring the continuous cycling of materials in the ecosystem.
2. They help in the decomposition of dead organic matter, preventing its accumulation and keeping the environment clean.

Source: Our Environment, Chapter 13

Explanation

- Examiners expect a clear **definition** (1 mark), **two examples** ($\frac{1}{2} + \frac{1}{2}$ mark), and **two distinct points** on balancing the ecosystem (1 mark).
- Key phrases to include: "*break down complex organic matter*," "*simple inorganic substances*," "*nutrient cycling/recycling*."
- Bacteria and fungi are the standard examples accepted; naming a specific organism like *Rhizopus* is a bonus but not required.
- Do **not** confuse decomposers with consumers — decomposers act on *dead* organic matter.

Q66. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS?**[3]**

What are human-made ecosystems? Give an example. Can a human-made ecosystem become a self-sustaining ecosystem? Give reason to justify your answer.

Previously asked in: 2022 31/3/1 Q8

◆ Our Environment

Human-made (artificial) ecosystems

Self-sustaining Ecosystems

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Model Answer

Human-made ecosystems are artificial ecosystems created and maintained by humans. Examples: garden, crop-field, aquarium.

Can it become self-sustaining? Yes. An aquarium, for instance, can become self-sustaining if aquatic plants (producers), animals (consumers), and microorganisms (decomposers) are added together. The plants produce food and oxygen through photosynthesis, animals consume them, and decomposers break down dead matter into simple substances reused by plants — making the system self-sustaining without external inputs.

Source: Chapter 13, Section 13.1 (Activity 13.1)

Explanation

- **1 mark:** Definition of human-made ecosystem + example.
- **1 mark:** Yes, it can become self-sustaining.
- **1 mark:** Reason — presence of all three components (producers, consumers, decomposers) creates a balanced, self-sufficient cycle.

Examiners expect you to name the aquarium as the example (directly from Activity 13.1) and explain the role of all three biotic components in making it self-sustaining. Avoid vague answers — mention photosynthesis, food production, and decomposition explicitly.

Q67. § 13.2.2 Managing the Garbage we Produce

[2]

Kulhads (disposable cups made of clay) and disposable paper cups both are used as an alternative for disposable plastic cups. Which one of these two can be considered as a better alternative to plastic cups and why?

Previously asked in: 2022 31/3/1 Q1(a)

♦ Our Environment

Biodegradable vs Non-biodegradable waste and sustainable alternatives to plastic

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Model Answer

Disposable **paper cups** are a better alternative to plastic cups.

- Kulhads, though biodegradable, require large amounts of fertile **top-soil** to produce on a large scale, leading to soil loss.
- Paper cups are biodegradable and do not deplete top-soil.
- Plastic cups are **non-biodegradable** and persist in the environment for a long time, harming the ecosystem.

Source: Chapter 13, Section 13.2.2 (Think it over — Disposable cups in trains)

Explanation

The textbook's "Think it over" box directly addresses this comparison. The examiner expects you to mention **both** the drawback of kulhads (loss of fertile top-soil on large-scale production) and the advantage of paper cups (biodegradable, no soil depletion) over plastic (non-biodegradable). Simply saying "paper cups are better because they are biodegradable" without explaining the kulhad problem will likely cost you a mark. Stick to what the passage says — do not bring in outside points.

Q68. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?

Answer the following: State one ill-effect of the absence of decomposers from a natural ecosystem.

Previously asked in: 2022 31/1/1 Q13 (c)

♦ Our Environment

Role of Decomposers in Ecosystem

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Model Answer

If decomposers are absent from an ecosystem, dead organic matter (dead plants and animals) will accumulate and will not be broken down. As a result, nutrients will not be returned to the soil, making it infertile, and the natural recycling of materials will stop completely.

Explanation

Examiners expect you to mention **two linked points**: (1) accumulation of dead organic matter, and (2) nutrients not being recycled/soil becoming infertile. Just stating "dead matter will pile up" alone may not fetch full marks. The role of decomposers is to break down complex organic matter into simple inorganic nutrients that are returned to the soil for reuse by producers — absence of decomposers breaks this cycle.

Q69. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage we Produce

[3]

Write one difference between biodegradable and non-biodegradable wastes. List two impacts of each type of the accumulated waste on environment if not disposed off properly.

Previously asked in: 2023 31/4/1 Q33

♦ Our Environment

Biodegradable vs Non-biodegradable Wastes

Environmental Impact of Improper Waste Disposal

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Model Answer

Difference:

Biodegradable wastes are broken down by biological processes (microorganisms), e.g., vegetable peels. Non-biodegradable wastes cannot be broken down biologically and persist in the environment, e.g., plastics.

Impacts of biodegradable waste:

1. Decomposition produces foul smell and acts as a breeding ground for disease-causing organisms.
2. Excessive decomposition can cause soil and water pollution, depleting oxygen in water bodies.

Impacts of non-biodegradable waste:

1. Causes biological magnification — harmful chemicals accumulate in higher trophic levels.
2. Persists in the environment for a long time, harming organisms and polluting soil and water.

Source: Chapter 13, Section 13.2.2

Explanation

- The examiner expects **one clear difference** (1 mark), **two impacts of biodegradable** (1 mark), and **two impacts of non-biodegradable** (1 mark) — total 3 marks.
- Don't just say "causes pollution" — be slightly specific (soil, water, biological magnification).
- The term **biological magnification** scores well for non-biodegradable impacts as it is a key term from this chapter.
- Keep each point concise; one line per impact is sufficient.

Q70. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS?**[2]**

We do not clean ponds or lakes but an aquarium needs to be cleaned regularly. Why ?

Previously asked in: 2023 31/2/1 Q26

◆ **Our Environment**

Self-sustaining ecosystem vs artificial ecosystem

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Ponds and lakes are **natural ecosystems** with a complete set of producers, consumers, and decomposers. Decomposers break down dead matter naturally, maintaining balance without human intervention.

An aquarium is an **artificial ecosystem** with limited decomposers and space. Waste accumulates faster than it can be broken down, making regular cleaning necessary to prevent toxic build-up and keep the organisms alive.

Source: Chapter 13, Section 13.1 – Ecosystem and its Components

Explanation

- The key contrast is **natural vs. artificial ecosystem**.
- In natural ecosystems, decomposers efficiently recycle waste at scale; in an aquarium, the system is too small and incomplete to be self-sustaining without help.
- Mention both: why ponds don't need cleaning AND why aquariums do — examiners expect both sides for full 2 marks.

Q71. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS? § 13.2.2 Managing the Garbage we Produce**[1]**

Assertion (A) : Natural replenishment of soil will not take place in absence of microbes.

Reason (R) : Microbes, comprising of bacteria and fungi, break down dead remains and waste products of organisms, and they go into the soil.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2026 31/3/1 Q8

◆ **Our Environment**

Role of microbes (decomposers) in nutrient replenishment of soil

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(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Microbes (bacteria and fungi) decompose dead organic matter, returning nutrients to the soil, thus enabling its natural replenishment.

Explanation

The Reason directly explains *why* the Assertion is true — without microbial decomposition, dead matter would not break down and nutrients would not be returned to the soil, so replenishment would stop. Option (A) is correct because R is not just true but is the **cause** behind A. Remember: choose (B) only when R is true but explains something else, not the assertion itself.

Q72. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?

Answer the following questions: Mention any one harmful effect of using plastic bags on the environment. Suggest better alternatives to the usage of plastic bags.

Previously asked in: 2026 31/5/1 Q14 (a)

◆ Our Environment

Alternatives to plastic bags / biodegradable vs non-biodegradable waste

Harmful effects of plastic on the environment

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Model Answer

Harmful effect of plastic bags: Plastic bags are non-biodegradable and persist in the environment for a very long time. They choke drains, harm animals that accidentally consume them, and pollute soil and water bodies.

Better alternatives: Instead of plastic bags, we can use **cloth bags** or **paper bags** for shopping and carrying goods. These are biodegradable and environment-friendly.

Source: Chapter 13 – Our Environment, Section 13.2.2 Managing the Garbage we Produce

Explanation

- The question has two parts; both must be answered for full marks.
- The passage explicitly mentions that non-biodegradable substances like plastics "persist in the environment for a long time or may harm the various members of the ecosystem." The exercise also mentions carrying cloth-bags as an environment-friendly practice — use both for a complete answer.
- Avoid writing a long essay; 3–4 crisp lines covering one harm and one/two alternatives are enough.

Q73. § 13.1 ECO-SYSTEM — WHAT ARE ITS COMPONENTS? § 13.1.1 Food Chains and Webs § 13.2 HOW DO OUR ACTIVITIES AFFECT [1] THE ENVIRONMENT?

In an ecosystem, the decomposers perform an important role. Select the option indicating the role of decomposers.

- (A) Convert inorganic materials to simpler forms
- (B) Break down complex organic substances to simple inorganic substances.
- (C) Break down inorganic substances into organic substances.
- (D) Do not act on organic compounds.

Previously asked in: 2026 31/5/1 Q7

◆ Our Environment

Role of Decomposers in an Ecosystem

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Model Answer

(B) Break down complex organic substances to simple inorganic substances.

Explanation

Decomposers (bacteria, fungi) act on dead organic matter and break it down into simple inorganic nutrients, which are returned to the soil. This is their key role in nutrient cycling. Option A is wrong (it says "inorganic to simpler forms"); C and D are clearly incorrect. Examiners expect the exact function: **organic** → **inorganic**.

Q74. § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?

[1]

Which of the following is a non-biodegradable pollutant ?

- (A) Paper
- (B) DDT
- (C) Wood
- (D) Vegetable peel

Previously asked in: 2026 31/5/1 Q6

♦ Our Environment

Biodegradable and Non-biodegradable Pollutants

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Model Answer**(B) DDT**

DDT is a non-biodegradable pollutant; it cannot be broken down by biological processes and persists in the environment for a long time.

Explanation

- Paper, wood, and vegetable peels are biodegradable — they are broken down by bacteria/saprophytes.
- DDT (a pesticide) is a classic example of a non-biodegradable substance; it also causes **biological magnification** as it accumulates up the food chain.
- The textbook (Ch. 13) defines non-biodegradable substances as those not broken down by biological processes and which persist in the environment.

Q75. § Introduction § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?**[1]**

Given below are some of the statements regarding our environment :

- (i) Change in our life-styles have resulted in greater amounts of waste material generation.
- (ii) Changes in attitude have resulted in use of more disposable things.
- (iii) Changes in packaging has resulted in much of our waste becoming non-biodegradable.
- (iv) Organic farming.

Which amongst these is not leading to any damage of environment ?

- (A) (i), (ii), (iii)
- (B) (iv)
- (C) (i) and (iii)
- (D) (ii) and (iv)

Previously asked in: 2026 31/4/1 Q3

◆ **Our Environment**

Waste Generation and Biodegradable vs Non-biodegradable Substances

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Model Answer**(B) (iv)**

Organic farming does not damage the environment; statements (i), (ii), and (iii) all describe practices that increase waste or non-biodegradable material, harming the environment.

Explanation

The textbook explicitly states that improved lifestyles → more waste (i), disposable items (ii), and non-biodegradable packaging (iii) all negatively impact the environment. Organic farming, however, avoids synthetic chemicals and is an environment-friendly practice. The examiner expects students to identify that only option (iv) is harmless/beneficial.

Q76. § 13.1.1 Food Chains and Webs

[3]

What are trophic levels ? Why are autotrophs considered to be at the first trophic level of all food chains ? State the reason for limited number of trophic levels in nature.

Previously asked in: 2022 31/4/1 Q9

◆ Our Environment

Autotrophs as Producers at the First Trophic Level

Limited Number of Trophic Levels – 10% Energy Law

Trophic Levels

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Model Answer

Trophic levels: Each step or level of a food chain at which organisms feed is called a trophic level.

Autotrophs at first trophic level: Autotrophs (green plants) fix solar energy and convert it into chemical food energy, making it available for all other organisms. Since they are the primary source of energy for every food chain, they occupy the first trophic level.

Limited trophic levels: Only about 10% of energy is transferred from one trophic level to the next; the rest is lost as heat. So after three or four trophic levels, the energy available becomes too little to support any further level, limiting food chains to 3–4 steps.

Source: Chapter 13, Section 13.1.1 – Food Chains and Webs

Explanation

- Examiners expect three clear parts: definition of trophic levels, reason for autotrophs at T₁, and reason for limited levels.
- The **10% law** is the key concept for the third part — always mention that energy loss is so great that very little usable energy remains after four levels.
- Avoid long sentences; state each point directly and concisely.

Q77. § 13.1.1 Food Chains and Webs

[3]

Plants → Deer → Lion

In the given food chain, what will be the impact of removing all the organisms of second trophic level on the first and third trophic level? Will the impact be the same for the organisms of the third trophic level in the above food chain if they were present in a food web? Justify.

Previously asked in: 2024 31/1/1 Q33(A)

◆ Our Environment

Food Chain and Trophic Levels

Food web vs food chain – buffering effect on populations

Impact of removal of a trophic level on other trophic levels

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Model Answer

Impact on First Trophic Level (Plants):

If all deer (second trophic level) are removed, plants will no longer be eaten by deer. Their population will increase rapidly and overgrow, disturbing the ecosystem balance.

Impact on Third Trophic Level (Lion):

Lions will lose their food source (deer) and will starve, causing their population to decline and eventually die out.

In a Food Web:

No, the impact will **not** be the same. In a food web, lions have alternative prey available from other food chains. So lions can survive even without deer, making the ecosystem more stable and resilient.

Explanation

- Examiners expect three distinct points: effect on T₁, effect on T₃ in a food chain, and the contrasting effect in a food web.
- The key concept is that a **food web provides alternative pathways**, so organisms at higher trophic levels are less vulnerable compared to a simple food chain.
- Use terms like "trophic level," "food web," and "alternative prey" for full marks.
- Source: Chapter 13, Section 13.1.1 (Food Chains and Webs)

Q78. § Introduction § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?

[2]

Use of several pesticides which results in excessive accumulation of pesticides in rivers or ponds, is a matter of deep concern. Justify this statement.

Previously asked in: 2023 31/4/1 Q26

◆ Our Environment

Biological Magnification (Biomagnification) of Pesticides

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Model Answer

Pesticides are **non-biodegradable** substances. When they enter water bodies, they are absorbed by aquatic plants, then pass to herbivores, then to carnivores. At each trophic level, their concentration increases — a process called **biological magnification**. By the time they reach top consumers (including humans), the concentration becomes dangerously high, harming health and disrupting the ecosystem.

Explanation

The key concept here is **biological magnification** — examiners expect you to name it and explain that non-biodegradable pesticides accumulate progressively at each trophic level. Two marks = name the phenomenon + explain the consequence (harm to top consumers/ecosystem). Avoid writing vague answers like "it is harmful" without explaining *why* (i.e., the magnification mechanism).

Q79. § 13.1.1 Food Chains and Webs

[3]

Differentiate between food chain and food web. In a food chain consisting of deer, grass and tiger, if the population of deer decreases, what will happen to the population of organisms belonging to the first and third trophic levels ?

Previously asked in: 2024 31/5/1 Q33

♦ Our Environment

Food Chain vs Food Web – Differences

Trophic Levels and Population Dynamics

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Model Answer

Food Chain vs Food Web:

Food Chain	Food Web
A single linear sequence of organisms where each feeds on the one before it.	A network of interconnected food chains in an ecosystem.
Simple and less stable.	Complex and more stable.

Effect of decrease in deer population:

The food chain is: **Grass** → **Deer** → **Tiger**

- **First trophic level (Grass):** Population of grass will **increase**, as fewer deer are present to consume it.
- **Third trophic level (Tiger):** Population of tiger will **decrease**, as their primary food source (deer) has reduced.

Source: Our Environment, Section 13.1.1

Explanation

- Examiners expect a clear distinction between food chain and food web — one mark for differentiation.
- For the second part, correctly identify grass as 1st trophic level and tiger as 3rd trophic level — this is a common error students make.
- State the effect on **both** trophic levels with brief reasoning (1 mark each).
- A simple table for differentiation saves time and looks neat in board exams.

Q80. § Introduction § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT?

[2]

"Excessive use of chemicals and pesticides in agriculture adversely effect the environment." Justify this statement.

Previously asked in: 2025 31/1/1 Q26

♦ Our Environment

Biological Magnification / Accumulation of Pesticides and Chemicals in Food Chain

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Model Answer

Excessive use of chemicals and pesticides leads to **biological magnification** — harmful chemicals accumulate and become more concentrated at each higher trophic level in a food chain. Additionally, these non-biodegradable substances persist in the environment, polluting soil and water, disrupting the interdependence of ecosystem components and harming organisms at all trophic levels.

Explanation

- The examiner expects two key ideas: **biological magnification** (concentration of chemicals increasing up the food chain) and **persistence/non-biodegradable nature** of these chemicals polluting soil and water.
- The source passages emphasise ecosystem interdependence and the harmful effects of non-biodegradable waste — link your answer to these themes.
- Naming "biological magnification" specifically earns a mark; explaining the consequence earns the second mark.

Q81. § 13.1.1 Food Chains and Webs § 13.2 HOW DO OUR ACTIVITIES AFFECT THE ENVIRONMENT? § 13.2.2 Managing the Garbage [1]

we Produce

Give differences between the following : Consumers and decomposers

Previously asked in: 2026 31/1/1 Q14 (c)

♦ Our Environment

Trophic levels: consumers vs decomposers in food chains

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Model Answer

Consumers obtain energy by eating other organisms (plants or animals), while **decomposers** (bacteria, fungi) break down dead organic matter and absorb nutrients, recycling materials back into the ecosystem.

Source: *Our Environment*, Chapter 13, Section 13.1.1

Explanation

For a 1-mark question, examiners expect one clear contrasting point. State what each does: consumers *feed on* living organisms; decomposers *break down dead/decaying* matter. Mentioning examples (fungi, bacteria) is a bonus but not compulsory. Avoid writing a paragraph.

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